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U.S. Department
of Transportation

**Urban Mass
Transportation
Administration**

Listing of New Bus Technology Applications

Howell S. Glasser



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4200 Daniels Avenue
Annandale, Virginia 22003

December 1983
Final Report

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UMTA Technical Assistance Program

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16. Abstract This report presents the findings of research on bus purchases and demonstrations by transit properties in the United States involving innovative vehicles or equipment. Purchases and demonstrations have been catalogued for the last four years. The purchases included in this report show innovative equipment and new manufacturers in the American market. The trends toward mass bus purchases through consortia and a heightened interest in vehicles built by non-traditional manufacturers are shown. The report shows that there is extensive activity among transit properties which are looking for vehicles that can meet the requirements imposed by local operating conditions.			
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PREFACE

This report has been prepared by SG Associates, Inc. for the Transportation Systems Center's (TSC) Service Assessment Division in support of the Impact Assessment Program conducted by the U.S. Department of Transportation Urban Mass Transportation Administration (UMTA) Office of Technical Assistance, Office of Methods and Support, Analysis Division.

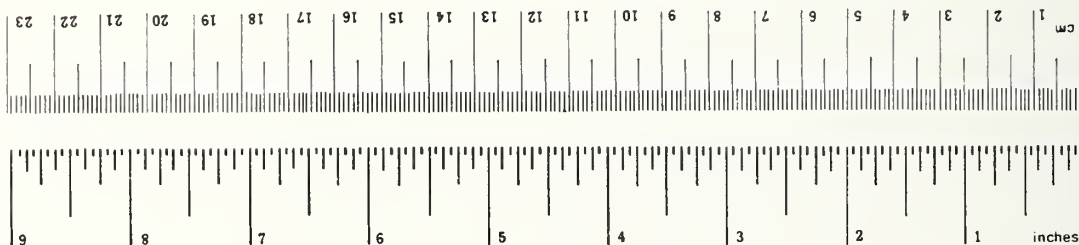
There have been numerous applications of innovative, or at least non-standard, transit bus technology in the United States in recent years. This report is a summary of innovative vehicle equipment and its application. The intent of this project is to make application of new technology generally known to the transit industry, so the results of trial applications can be melded with results of the U.S. Department of Transportation demonstrations.

Appreciation is expressed for the guidance and direction provided by Dr. Arthur Priver, the TSC technical contract monitor, and Mr. John Durham of UMTA.

METRIC CONVERSION FACTORS

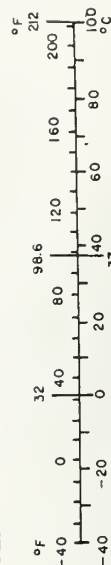
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
m ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-286.

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BUS TECHNOLOGY REVIEW

INTRODUCTION

In recent years there have been numerous applications of innovative, or at least non-standard, transit bus technology in the United States. This report presents a summary of innovative vehicle equipment and its application at transit properties across the country. It is valuable for those in the transit industry to be aware of application of new technology so that the results of its applications can be considered in light of USDOT demonstrations.

The New Bus Equipment Introduction (NBEI) Program is designed to demonstrate innovative features on transit buses and encourage the adoption of innovative features that enhance productivity. The program encourages selected transit operators, in conjunction with UMTA, to take the initiative in encouraging new types of transit equipment. A series of Technical Evaluation Reports will be prepared during the program, documenting improvements in fuel economy, accessibility and life cycle costs. A second series of reports will be prepared on the socio-economic impacts of the NBEI Program during pre-bid, procurement, operations and post operations stages. In April 1983 a socio-economic impact assessment was submitted to the Transportation Systems Center and in September 1983 a report on the procurement phase for the program will be completed.

Transit properties across the United States have not waited for the results of the NBEI Program. Bus purchases have continued. While most properties have continued to purchase buses from the traditional U.S. suppliers, others have chosen to purchase at least a few vehicles from non-traditional sources. Some of these vehicles contain "innovative" features by U.S. standards.

An effort has been made to research recent bus purchases to find out what kinds of vehicles and innovative features are being sought by various transit properties across the country. The list that follows contains information on vehicles purchased by transit properties during the last four years in which the vehicle or the equipment within the vehicle is unusual or innovative relative to the standard equipment used by most transit properties.

New bus demonstrations and purchases have been catalogued for the last four years based on news releases in Transit Industry journals and conversation with UMTA capital grants personnel. The more innovative purchases or demonstrations are listed at the conclusion of this synopsis. The criteria used for listing equipment purchases and demonstrations are as follows:

- * Articulated
- * New manufacturer
- * Unusual body style
- * Unusual power source

Articulated buses are still relatively new in the United States, although by no means a novelty. Since the first consortium purchase of M.A.N. articulated buses in the mid 1970's, a number of cities have increased their fleets of articulated buses. All articulated bus purchases in the United States are not listed here. However, purchases of articulated buses that appeared in the literature review are listed as a representative sample of recent purchases.

Any vehicles purchased from a manufacturer other than GMC or Flxible are deemed worthy of note since this indicates interest in the U.S. bus market by new manufacturers. All vehicle purchases from new manufacturers that were found in the literature review are listed.

Unusual body style is indicative of an effort by manufacturers to address the variety of vehicle uses found in the transit industry. Small buses and double-deckers are the most notable variations not already covered under the "articulated" category.

New power sources are of interest because of the emphasis on improved fuel economy, reduced noise and lower operating cost. All non-diesel power plants are reported. Turbo-charged diesels are reported as well, even though turbo-charging technology is not new. There is a renewed interest in turbo-charging to obtain better fuel economy and performance from a smaller engine. Until recently, it was more common to specify an eight cylinder diesel rather than a turbo-charged, six cylinder diesel.

These four criteria are adequate to cover the range of innovative vehicles recently purchased in the United States. A detailed listing of purchases follows along with tables summarizing the information.

FINDINGS

Transit properties across the United States have continued to purchase new buses to replace old equipment or expand their fleets. Transit properties are writing their own design specifications for their new equipment so performance goals can be achieved in light of the local environment. Transit properties are looking to a wider range of bus manufacturers, both foreign and domestic, in an effort to acquire vehicles that satisfy design specifications. As a result, manufacturers not previously in the American market have been able to secure a portion of the American bus sales to transit properties.

M.A.N. and Crown-Ikarus are becoming prevalent in large metropolitan areas utilizing articulated buses. Neoplan, which now manufactures its buses domestically, is becoming a leading contender in the market for new transit buses in large metropolitan cities. Flyer and Gillig are also heading into the American market for 40 foot transit buses. Scania, Renault, and Hino have initiated demonstrations with several metropolitan transit agencies and their buses have performed satisfactorily.

In the market for medium sized heavy duty buses Carpenter, Chance, Skillcraft, the Blue Bird Corporation, the Transportation Manufacturing Corporation (TMC) and Orion have successfully entered the American market. Previously nothing had been available in this class since GMC and Flxible ceased production of 30 foot models in the early 1970's.

With the entry of new manufacturers in the American market for transit buses innovative features are appearing. Some of these features include:

- * 6 cylinder turbo-charged engines
(Blue Bird and Grumman)
- * Articulated small buses (Chance)
- * Gas turbine engines (GMC)
- * Air cooled engines (IVECO)
- * Double-deck bodies (Neoplan)
- * Climate-specific equipment (Orion)
- * Dual-powered buses (Renault)

To fight the trend of ever increasing prices for new vehicles, consortia are being created to buy vehicles in volume purchases. Various properties are working together to find manufacturers that can satisfy the design specifications of a group of transit properties. Examples of these kinds of bus purchases include the Pittsburgh Consortium, which has been involved in pooling purchases of M.A.N. articulated buses for various transit properties across the United States. The Commonwealth of Pennsylvania has also arranged a 1000 vehicle purchase from Neoplan from which transit properties within the state will receive new 40 foot Neoplan buses as needed rather than procuring new buses on their own.

In an effort to gain recognition from bus purchasing consortia and individual transit properties, several bus manufacturers have initiated vehicle demonstrations with transit properties and government agencies. Renault and Hino have initiated demonstrations with transit properties in the state of New York through the New York Department of Transportation. Metro in Seattle, Washington, has been testing a prototype, dual-powered Renault bus. IVECO, an Italian manufacturer, has had a lease agreement with the Port Authority of Allegheny County in Pittsburgh, Pennsylvania, to test buses with air-cooled engines.

It is becoming common practice for transit properties to test prototype and production models through demonstrations before actual purchase agreements are consummated. This allows transit properties to assess how well a particular vehicle manufacturer's product performs under operating conditions and to determine whether modifications will be necessary if production models are purchased. In Seattle it has been determined that the Renault dual-powered bus will have to undergo three or four sets of modifications before the vehicle will perform satisfactorily under actual operating conditions. In Sarasota, Florida, two Skillcraft buses were tested successfully and were

purchased along with an additional 21 vehicles. In Sacramento and Riverside, California, a hydrogen/propane fueled bus was tested unsuccessfully by the California Department of Transportation and the test results were disseminated to other interested transit operators.

In an attempt to determine which manufacturer best satisfies the needs of various transit properties, vehicles are being compared under test conditions in some locations. In Michigan, where the state Department of Transportation buys buses for small transit properties across the state, buses are being procured for testing so that it can be determined which vehicle meets the operating requirements presented by the state's transit operators. In Norwalk, Connecticut, a Scania bus was found to be quieter than the GMC RTS II and bus drivers found the Scania bus superior for its maneuverability, power and driver comfort.

These and other applications of new transit technology are listed in appendices to this report. The items are listed and then summarized by city and manufacturer.

1. Appendix A: Listing of Bus Purchases
2. Appendix B: Summary of Innovative Features By City
3. Appendix C: Summary of Locations and Manufacturers
4. Appendix D: Manufacturer Information
5. Appendix E: Report of New Technology

CONCLUSION

The NBEI Program will provide a thorough evaluation of different kinds of innovative equipment at specific locations. Data will be collected in 1983-84 and a detailed analysis will be carried out of the performance and impacts of the new equipment. Additional information, to supplement information gained through the NBEI Program, can be obtained through use studies and reviews of other projects carried out prior to or independent of the NBEI Program. Dissemination of this information would aid other properties considering bus purchase.

In examining recent bus purchases by transit properties across the country it is apparent that transit bus manufacturers will be serving a market which is becoming increasingly specialized. Transit properties are writing vehicle specifications which address the needs of the different kinds of services offered. High volume transit services will increasingly be provided by high capacity vehicles such as articulated buses. Handicapped services, short routes and rail feeder routes will favor heavy duty small buses. With rising energy costs, the use of brake retarders and turbo charged engines along with other equipment which improves vehicle performance will be in demand. With encouragement provided by UMTA and the initiative of transit operators the transit bus market will become more responsive to the equipment needs of the public transit industry.

APPENDIX A

LISTING OF BUS PURCHASES

Manufacturer: ATLANTIC RESEARCH CORPORATION
No. of Vehicles: 15 Delivery Date: JUNE, 1980
Cost Per Vehicle: 61,400 Purchase or Demonstration: PURCHASE
Transit Property: GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY
Street Address: 615 WEST SUPERIOR
City: CLEVELAND State: OHIO Zip: 44115
Contact: DAVID SILVIA, DIRECTOR OF PROCUREMENT Telephone: 216-556-5278
Description: MINI-BUSES
LIFT EQUIPPED WITH FOUR WHEELCHAIR TIE DOWNS

Manufacturer Information
Company: ATLANTIC RESEARCH CORPORATION
Address: 5390 CHEROKEE AVENUE; ALEXANDRIA, VIRGINIA 22314
Contact: GEORGE SUMMERS, ADVANCED PROGRAMS DIR. Telephone: 703-642-4000

Manufacturer: BILLINGS ENERGY CORPORATION
No. of Vehicles: 1 Delivery Date: AUGUST, 1980
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: SACRAMENTO REGIONAL TRANSIT DISTRICT
Street Address: P.O. BOX 2110
City: SACRAMENTO State: CALIFORNIA Zip: 95810
Contact: BOB SMITH, ASSOC. ENGINEER-CALTRANS Telephone: 916-322-1420
Description: HYDROGEN/PROPANE FUELED
DEMONSTRATION BY CALTRANS; TESTS ALSO CONDUCTED IN RIVERSIDE; POOR RESULTS;
SHORT RANGE AND SLOW REFUELING PROCESS

Manufacturer Information
Company: BILLINGS ENERGY CORPORATION
Address: NOT AVAILABLE
Contact: NOT AVAILABLE Telephone: NOT AVAILABLE

Manufacturer: BLUE BIRD

No. of Vehicles: 20

Delivery Date: MAY, 1981

Cost Per Vehicle: 103,039

Purchase or Demonstration: PURCHASE

Transit Property: CENTRAL ARKANSAS TRANSIT

Street Address: 100 MAIN STREET, ROOM 509

City: LITTLE ROCK

State: ARKANSAS

Zip: 72201

Contact: JOHN MILLIGAN, GENERAL MANAGER

Telephone: 501-375-6513

Description: TURBO-CHARGED

V-6 DETROIT DIESEL; 30 FOOT BODIES

Manufacturer Information

Company: BLUE BIRD BODY COMPANY, CITY BUS SALES

Address: P.O. BOX 937; FORT VALLEY, GEORGIA 31030

Contact: RICHARD C. CRAFT, SALES MANAGER

Telephone: 912-825-2021

Manufacturer: CARPENTER

No. of Vehicles: 4

Delivery Date: FEBRUARY, 1983

Cost Per Vehicle: 118,950

Purchase or Demonstration: PURCHASE

Transit Property: METROPOLITAN TRANSIT COMMISSION

Street Address: 801 AMERICAN CENTER BUILDING

City: ST. PAUL

State: MINNESOTA

Zip: 55101

Contact: ARTHUR SEEBACH, ENGINEER

Telephone: 612-642-2676

Description: SHORT WHEEL BASE

HEAVY DUTY VEHICLE WITH A SHORT WHEEL BASE AND THE CAPACITY TO CARRY FIVE OR SIX WHEELCHAIR PASSENGERS SIMULTANEOUSLY

Manufacturer Information

Company: CARPENTER BODY WORKS, INC.

Address: MICHELL, INDIANA 47446

Contact: DICK O'NEIL, COMMERCIAL SALES MGR.

Telephone: 812-849-3131

Manufacturer: CHANCE
No. of Vehicles: 1 Delivery Date: AUGUST, 1980
Cost Per Vehicle: 56,000 Purchase or Demonstration: DEMONSTRATION
Transit Property: METROPOLITAN TRANSIT AUTHORITY
Street Address: 1825 SOUTH MCLEAN BOULEVARD
City: WICHITA State: KANSAS Zip: 67213
Contact: DICK RUDELL, SUPERINTENDENT OF TRANSP. Telephone: 316-265-7221
Description: ARTICULATED SMALL BUS
TRAILOR ATTACHED TO CHANCE BUS; ALL FOUR WHEELS TURN FOR GOOD MANEUVERABILITY;
PROBLEMS WITH FARE COLLECTION AND SECURITY

Manufacturer Information

Company: CHANCE MANUFACTURING COMPANY, INC., COACH DIVISION
Address: 4219 IRVING STREET; WICHITA, KANSAS 67277-2328
Contact: JOE DIEHL, V.P. OF TRANSIT SALES Telephone: 316-942-7411

Manufacturer: CROWN-IKARUS
No. of Vehicles: 8 Delivery Date: OCTOBER, 1983
Cost Per Vehicle: 237,000 Purchase or Demonstration: PURCHASE
Transit Property: CAPITAL DISTRICT TRANSPORTATION AUTHORITY
Street Address: 110 WATERVLIET AVENUE
City: ALBANY State: NEW YORK Zip: 12206
Contact: RICHARD LONG, MGR. OF PURCHASING Telephone: 518-482-8067
Description: ARTICULATED
MID-AXLE DRIVE WITH SEATS FOR 74

Manufacturer Information

Company: CROWN COACH CORPORATION, TRANSIT VEHICLE DIVISION
Address: 2428 EAST 12TH STREET; LOS ANGELES, CALIFORNIA 90021
Contact: BILL CORYELL, TRANSIT PROGRAM DIRECTOR Telephone: 213-627-4021

Manufacturer: CROWN-IKARUS

No. of Vehicles: 87

Delivery Date: SEPTEMBER, 1981

Cost Per Vehicle: 231,500

Purchase or Demonstration: PURCHASE

Transit Property: TRI-COUNTY METROPOLITAN DISTRICT OF OREGON

Street Address: 4012 S.E. 17TH AVENUE

City: PORTLAND

State: OREGON

Zip: 97202

Contact: JIM COWEN, MANAGER

Telephone: 503-238-4915

Description: ARTICULATED

PURCHASED FOR AMERICAN ENGINE AND POWER TRAIN; CONCERN WITH AVAILABILITY OF PARTS

Manufacturer Information

Company: CROWN COACH CORPORATION, TRANSIT VEHICLE DIVISION

Address: 2428 EAST 12TH STREET; LOS ANGELES, CALIFORNIA 90021

Contact: BILL CORYELL, TRANSIT PROGRAM DIRECTOR Telephone: 213-627-4021

Manufacturer: CROWN-IKARUS

No. of Vehicles: 15

Delivery Date: JULY, 1981

Cost Per Vehicle: 229,000

Purchase or Demonstration: PURCHASE

Transit Property: TRANSIT AUTHORITY OF RIVER CITY

Street Address: 1000 WEST BROADWAY

City: LOUISVILLE

State: KENTUCKY

Zip: 40203

Contact: BILL MASON, PLANNING DEPARTMENT

Telephone: 502-587-2688

Description: ARTICULATED

CAPACITY FOR 73 WITH SEATS IN TURNABLE AREA; MID-AXLE DRIVE; PONY ENGINE IN REAR SECTION FOR AIR CONDITIONING

Manufacturer Information

Company: CROWN COACH CORPORATION, TRANSIT VEHICLE DIVISION

Address: 2428 EAST 12TH STREET; LOS ANGELES, CALIFORNIA 90021

Contact: BILL CORYELL, TRANSIT PROGRAM DIR. Telephone: 213-627-4021

Manufacturer: CROWN-IKARUS
No. of Vehicles: 40 Delivery Date: OCTOBER, 1983
Cost Per Vehicle: 217,000 Purchase or Demonstration: PURCHASE
Transit Property: MILWAUKEE COUNTY TRANSIT SYSTEM
Street Address: ROOM 201, COURTHOUSE
City: MILWAUKEE State: WISCONSIN Zip: 53233
Contact: HENRY MAYER, GENERAL MANAGER Telephone: 414-937-3282
Description: ARTICULATED
SEATS FOR 70 PASSENGERS WITH WIDE DOORS; NO AIR CONDITIONING

Manufacturer Information

Company: CROWN COACH CORPORATION, TRANSIT VEHICLE DIVISION
Address: 2428 EAST 12TH STREET; LOS ANGELES, CALIFORNIA 90021
Contact: BILL CORYELL, TRANSIT PROGRAM DIRECTOR Telephone: 213-627-4021

Manufacturer: GILLIG
No. of Vehicles: 30 Delivery Date: OCTOBER, 1981
Cost Per Vehicle: 140,000 Purchase or Demonstration: PURCHASE
Transit Property: CENTRAL CONTRA COSTA TRANSIT AUTHORITY
Street Address: 1990 NORTH CALIFORNIA BOULEVARD
City: WALNUT CREEK State: CALIFORNIA Zip: 94596
Contact: HOWARD SAWYER, OPERATIONS AND MAINT. Telephone: 415-930-8999
Description: SIX CYLINDER DIESEL
35 FOOT BODIES WITH 47 SEATS

Manufacturer Information

Company: GILLIG CORPORATION
Address: 25800 CLAWITER ROAD; HAYWARD, CALIFORNIA 94545
Contact: KEITH BARNES, DIR. OF TRANSIT SALES Telephone: 415-785-1500

Manufacturer: GMC
No. of Vehicles: 5 Delivery Date: JUNE, 1980
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: MASS TRANSIT ADMINISTRATION OF MARYLAND
Street Address: 109 EAST REDWOOD STREET
City: BALTIMORE State: MARYLAND Zip: 21202
Contact: RUSSELL PENTZ, DIR. OF MAINTENANCE Telephone: 301-539-0767
Description: GAS TURBINE ENGINE
HEAT AND SEAL PROBLEMS; RTS' RETROFITTED BACK TO ORIGINAL EQUIPMENT;
DEMONSTRATION BY NASA AND THE DEPARTMENT OF ENERGY

Manufacturer Information

Company: GENERAL MOTORS CORPORATION, TRUCK AND COACH DIVISION
Address: 660 SOUTH BOULEVARD EAST; PONTIAC, MICHIGAN 48053
Contact: EDWARD R. STOKEL, DIR. PUBLIC TRANSP. Telephone: 313-857-4077

Manufacturer: GRUMMAN
No. of Vehicles: 10 Delivery Date: JUNE, 1982
Cost Per Vehicle: 150,000 Purchase or Demonstration: PURCHASE
Transit Property: LINCOLN TRANSPORTATION SYSTEM
Street Address: 710 J STREET
City: LINCOLN State: NEBRASKA Zip: 68508
Contact: ROGER VANCE, MAINT. SUPERINTENDENT Telephone: 402-471-7185
Description: TURBO-CHARGED
SIX CYLINDER DIESEL; SEATING FOR 48; CONCERN WITH FUEL ECONOMY

Manufacturer Information

Company: GRUMMAN FLXIBLE CORPORATION
Address: 970 PITTSBURGH DRIVE; DELAWARE, OHIO 43015
Contact: JOHN M. MADDOX, DIR. OF MARKETING Telephone: 614-369-7671

Manufacturer: HINO
No. of Vehicles: 1 Delivery Date: JUNE, 1982
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: NEW YORK STATE D.O.T.
Street Address: 2 WORLD TRADE CENTER, ROOM 5454
City: NEW YORK State: NEW YORK Zip: 10047
Contact: HARRY STANTON Telephone: 212-938-3299
Description: HINO MODEL RUC 18S
40 FOOT BODY; TRANSVERSE REAR MOUNTED ENGINE; MANY AMERICAN COMPONENTS USED
BECAUSE OF BETTER PARTS AVAILABILITY

Manufacturer Information
Company: HINO MOTORS, LIMITED; PLANNING DIVISION
Address: 7-17, NIHONBASHI 1-CHOME; CHOU-KU, TOKYO 103; JAPAN
Contact: SHINICHI FUNAKUBO, EXPORT SALES Telephone: 03-281-3323

Manufacturer: HINO
No. of Vehicles: 2 Delivery Date: MAY, 1981
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: NEW YORK STATE D.O.T.
Street Address: 2 WORLD TRADE CENTER, ROOM 5454
City: NEW YORK State: NEW YORK Zip: 10047
Contact: HARRY STANTON Telephone: 212-938-3299
Description: HINO MODEL RC
37 FOOT BODY, IN-LINE REAR MOUNTED ENGINE, LONG REAR OVERHANG CAUSED SOME
MANEUVERING PROBLEMS; BUSES HAVE BEEN TESTED IN ALBANY, BUFFALO, NEW YORK,
ROCHESTER, SYRACUSE, AND WESTCHESTER
Manufacturer Information
Company: HINO MOTORS, LIMITED; PLANNING DIVISION
Address: 7-17, NIHONBASHI 1-CHOME; CHUO-KU, TOKYO 103; JAPAN
Contact: SHINICHI FUNAKUBO, EXPORT SALES Telephone: 03-281-3323

Manufacturer: IVECO
No. of Vehicles: 1 Delivery Date: FEBRUARY, 1982
Cost Per Vehicle: 110,000 Purchase or Demonstration: DEMONSTRATION
Transit Property: PORT AUTHORITY OF ALLEGHENY COUNTY
Street Address: BEAVER AND ISLAND AVENUES
City: PITTSBURGH State: PENNSYLVANIA Zip: 15233
Contact: MIKE MANNING, MGR. OF MAINT. SYSTEMS Telephone: 412-237-7290
Description: AIR-COOLED ENGINE
AIR-COOLED DIESEL WITH VOITH TRANSMISSION; VEHICLE HAS PERFORMED
SATISFACTORILY

Manufacturer Information
Company: IVECO, BUS DIVISION
Address: VIA TOSCANA 9; PESCARITO, SAN MAURO TORINESE; TORINO 10100; ITALY
Contact: H. KUSGENS, EXPORT SALES Telephone: 011-244644

Manufacturer: M.A.N.
No. of Vehicles: 15 Delivery Date: JULY, 1983
Cost Per Vehicle: 300,000 Purchase or Demonstration: PURCHASE
Transit Property: SANTA CLARA COUNTY TRANSPORTATION AGENCY
Street Address: 1555 BERGER DRIVE
City: SAN JOSE State: CALIFORNIA Zip: 95112
Contact: PADRO GUZMAN, ENGINEER Telephone: 408-299-2362
Description: ARTICULATED
SEATING FOR 70 WITH SEATS IN TURNABLE AREA; MID-AXLE DRIVE; LIFT EQUIPPED

Manufacturer Information
Company: M.A.N. TRUCK AND BUS CORPORATION
Address: 201 SOUTH COLLEGE STREET; CHARLOTTE, NORTH CAROLINA 28202
Contact: GEORGE E. PICKETT, TRANSIT SALES Telephone: 704-376-6000

Manufacturer: M.A.N.

No. of Vehicles: 21

Delivery Date: FEBRUARY, 1984

Cost Per Vehicle: 265,000

Purchase or Demonstration: PURCHASE

Transit Property: INDIANAPOLIS PUBLIC TRANSPORTATION CORPORATION

Street Address: 600 CIRCLE TOWER

City: INDIANAPOLIS

State: INDIANA

Zip: 46204

Contact: BILL PETERSON, DIR. OPERATIONS PLANNING Telephone: 317-635-2100

Description: ARTICULATED

SEATS FOR 72 WITH SEATING IN TURNABLE AREA; MID-AXLE DRIVE; KNEELERS

Manufacturer Information

Company: M.A.N. TRUCK AND BUS CORPORATION

Address: 201 SOUTH COLLEGE STREET; CHARLOTTE, NORTH CAROLINA 28202

Contact: GEORGE E. PICKETT, TRANSIT SALES

Telephone: 704-376-6000

Manufacturer: M.A.N.

No. of Vehicles: 10

Delivery Date: AUGUST, 1983

Cost Per Vehicle: 275,000

Purchase or Demonstration: PURCHASE

Transit Property: MEMPHIS AREA TRANSIT AUTHORITY

Street Address: P.O. BOX 122

City: MEMPHIS

State: TENNESSEE

Zip: 38101

Contact: LAWSON ALBRITTON, EXECUTIVE ASSISTANT Telephone: 901-528-2859

Description: ARTICULATED

72 SEATS WITH SEATING IN TURNABLE AREA; MID-AXLE DRIVE; KNEELERS

Manufacturer Information

Company: M.A.N. TRUCK AND BUS CORPORATION

Address: 201 SOUTH COLLEGE STREET; CHARLOTTE, NORTH CAROLINA 28202

Contact: GEORGE E. PICKETT, TRANSIT SALES

Telephone: 704-376-6000

Manufacturer: M.A.N.
No. of Vehicles: 62 Delivery Date: JULY, 1981
Cost Per Vehicle: 275,000 Purchase or Demonstration: PURCHASE
Transit Property: METROPOLITAN TRANSIT COMMISSION
Street Address: 800 AMERICAN CENTER BUILDING
City: ST. PAUL State: MINNESOTA Zip: 55101
Contact: CECIL TAMMEN, ENGINEER Telephone: 612-642-2622
Description: ARTICULATED
64 SEATS WITH SEATS IN TURNTABLE AREA; MID-AXLE DRIVE; KNEELER; EQUIPPED
WITH AUXILIARY HEATER

Manufacturer Information
Company: M.A.N. TRUCK AND BUS CORPORATION
Address: 201 SOUTH COLLEGE STREET; CHARLOTTE, NORTH CAROLINA 28202
Contact: GEORGE E. PICKETT, TRANSIT SALES Telephone: 704-376-6000

Manufacturer: M.A.N.
No. of Vehicles: 30 Delivery Date: APRIL, 1983
Cost Per Vehicle: 269,000 Purchase or Demonstration: PURCHASE
Transit Property: PORT AUTHORITY OF ALLEGHENY COUNTY
Street Address: BEAVER AND ISLAND AVENUES
City: PITTSBURGH State: PENNSYLVANIA Zip: 15233
Contact: MIKE MANNING, MGR. OF MAINT. SYSTEMS Telephone: 412-237-7290
Description: ARTICULATED
MID-AXLE DRIVE; UNDER FLOOR DIESEL; 63 SEATS WITH SEATING IN TURNTABLE AREA;
KNEELERS

Manufacturer Information
Company: M.A.N. TRUCK AND BUS CORPORATION
Address: 201 SOUTH COLLEGE STREET; CHARLOTTE, NORTH CAROLINA 28202
Contact: GEORGE E. PICKETT, TRANSIT SALES Telephone: 704-376-6000

Manufacturer: M.A.N.
No. of Vehicles: 10 Delivery Date: MAY, 1979
Cost Per Vehicle: 170,000 Purchase or Demonstration: PURCHASE
Transit Property: METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY
Street Address: 401 WEST PEACHTREE
City: ATLANTA State: GEORGIA Zip: 30365
Contact: JIM HUGGINS, DIR. OF MAINTENANCE Telephone: 404-294-3201
Description: ARTICULATED
SEATING FOR 67 WITH SEATS IN TURNTABLE AREA; MID-AXLE DRIVE WITH 6 CYLINDER
DIESEL UNDER FLOOR ENGINE

Manufacturer Information
Company: M.A.N. TRUCK AND BUS CORPORATION
Address: 201 SOUTH COLLEGE STREET; CHARLOTTE, NORTH CAROLINA 28202
Contact: GEORGE E. PICKETT, TRANSIT SALES Telephone: 704-376-6000

Manufacturer: MINICAR-VETTER OF GERMANY
No. of Vehicles: 13 Delivery Date: SEPTEMBER, 1982
Cost Per Vehicle: 240,000 Purchase or Demonstration: PURCHASE
Transit Property: REGIONAL TRANSPORTATION DISTRICT
Street Address: 1325 SOUTH COLORADO BOULEVARD
City: DENVER State: COLORADO Zip: 80222
Contact: LEWIS FARBER, PLANNING ANALYST Telephone: 303-628-9000
Description: SHUTTLE BUSES
SHUTTLE BUSES FOR TRANSIT-WAY; LOW FLOORS; EXTRA SOUND INSULATION; RIGHT-SIDE
DRIVER; FRONT WHEEL DRIVE; 8.2L DETROIT DIESEL "FUEL SQUEEZER" ENGINE;
15 SEATS; 55 STANDEES
Manufacturer Information
Company: MCR TECHNOLOGY, INC.
Address: 55 DEPOT ROAD; GOLETA, CALIFORNIA 93117
Contact: SAM ROMANO, VICE PRESIDENT Telephone: 805-964-0671

Manufacturer: MINICAR-VETTER OF GERMANY

No. of Vehicles: 6 Delivery Date: SEPTEMBER, 1982

Cost Per Vehicle: 310,000 Purchase or Demonstration: PURCHASE

Transit Property: REGIONAL TRANSPORTATION DISTRICT

Street Address: 1325 SOUTH COLORADO BOULEVARD

City: DENVER State: COLORADO Zip: 80222

Contact: LEWIS FARBER, PLANNING ANALYST Telephone: 303-628-9000

Description: SHUTTLE BUSES

SHUTTLE BUSES FOR TRANSIT-WAY; BATTERY POWERED WITH FRONT WHEEL DRIVE;

RIGHT SIDE DRIVER; 15 SEATS; 55 STANDEES

TWO HOURS OF OPERATION BETWEEN CHARGES

Manufacturer Information

Company: MCR TECHNOLOGY, INC.

Address: 55 DEPOT ROAD; GOLETA, CALIFORNIA 93117

Contact: SAM ROMANO, VICE PRESIDENT Telephone: 805-964-0671

Manufacturer: NEOPLAN

No. of Vehicles: 20 Delivery Date: JANUARY, 1982

Cost Per Vehicle: 195,000 Purchase or Demonstration: PURCHASE

Transit Property: SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

Street Address: 425 SOUTH MAIN STREET

City: LOS ANGELES State: CALIFORNIA Zip: 90013

Contact: FRANK KIRSHNER, EQUIPMENT ENGINEERING Telephone: 213-972-6608

Description: DOUBLE-DECK BUSES

82 SEATS; 3 AXLES; LOW FLOORS AT ENTRY DOOR

Manufacturer Information

Company: NEOPLAN U.S.A. CORPORATION, SALES DIVISION

Address: 627 SOUTH BROADWAY, SUITE B; BOULDER, COLORADO 80303

Contact: ROLF RUPPENTHAL AND ASSOCIATES, INC. Telephone: 303-499-4040

Manufacturer: NEOPLAN
No. of Vehicles: 46 Delivery Date: JANUARY, 1983
Cost Per Vehicle: 243,000 Purchase or Demonstration: PURCHASE
Transit Property: METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY
Street Address: 401 WEST PEACHTREE
City: ATLANTA State: GEORGIA Zip: 30365
Contact: JIM HUGGINS, DIR. BUS MAINTENANCE Telephone: 404-294-3201
Description: ARTICULATED
REAR AXLE DRIVE; 69 SEATS WITH TURNABLE SEATING

Manufacturer Information
Company: NEOPLAN U.S.A. CORPORATION, SALES DIVISION
Address: 627 SOUTH BROADWAY, SUITE B; BOULDER, COLORADO 80303
Contact: ROLF RUPPENTHAL AND ASSOCIATES, INC. Telephone: 303-499-4040

Manufacturer: NEOPLAN
No. of Vehicles: 1 Delivery Date: APRIL, 1982
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: DALLAS TRANSIT SYSTEM
Street Address: 101 NORTH PEAK STREET
City: DALLAS State: TEXAS Zip: 75226
Contact: JIM WIESEHUEGEL, ASSIST. GENERAL MGR. Telephone: 214-827-3400
Description: ARTICULATED
ONE WEEK DEMONSTRATION; 65 SEATS WITH AIR CONDITIONING; REAR AXLE DRIVE;
PURCHASES OF ARTICS WILL START IN 1984 AND 200 SHOULD BE DELIVERED BY 1988

Manufacturer Information
Company: NEOPLAN U.S.A. CORPORATION, SALES DIVISION
Address: 627 SOUTH BROADWAY, SUITE B; BOULDER, COLORADO 80303
Contact: ROLF RUPPENTHAL AND ASSOCIATES, INC. Telephone: 303-499-4040

Manufacturer: ONTARIO BUS INDUSTRIES

No. of Vehicles: 50

Delivery Date: MARCH, 1984

Cost Per Vehicle: 126,000

Purchase or Demonstration: PURCHASE

Transit Property: INDIANAPOLIS PUBLIC TRANSPORTATION CORPORATION

Street Address: 600 CIRCLE TOWER

City: INDIANAPOLIS

State: INDIANA

Zip: 46204

Contact: BILL PETERSON, DIR. OPERATIONS PLANNING Telephone: 317-635-2100

Description: ORION MODEL

35 FOOT BODIES; 6 CYLINDER DIESEL WITH IN-LINE TRANSMISSION; CONCERN WITH FUEL ECONOMY; PROTOTYPE TO BE DELIVERED IN JANUARY, 1984

Manufacturer Information

Company: ONTARIO BUS INDUSTRIES, INC.

Address: 5395 MAINGATE DRIVE; MISSISSAUGA, ONTARIO L4W 2G6; CANADA

Contact: G.A. NEVISON, NATIONAL SALES MANAGER Telephone: 416-625-9510

Manufacturer: ONTARIO BUS INDUSTRIES

No. of Vehicles: 1

Delivery Date: OCTOBER, 1982

Cost Per Vehicle: 111,000

Purchase or Demonstration: PURCHASE

Transit Property: BARROW TRANSIT

Street Address: P.O. BOX 69

City: BARROW

State: ALASKA

Zip: 99723

Contact: JIM WILCOX, SERVICE MANAGER

Telephone: 907-852-2611

Description: CLIMATE-SPECIFIC EQUIPMENT

THERMO-PANE WINDOWS; PREHEATERS FOR ENGINE, FUEL AND COACH INTERIOR;
DOUBLE INSULATED BODY; TURBO CHARGED DIESEL ENGINE

Manufacturer Information

Company: ONTARIO BUS INDUSTRIES, INC.

Address: 5295 MAINGATE DRIVE; MISSISSAUGA, ONTARIO L4W 1G6; CANADA

Contact: G.A. NEVISON, NATIONAL SALES MANAGER Telephone: 416-625-9510

Manufacturer: RENAULT
No. of Vehicles: 1 Delivery Date: JULY, 1982
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: MUNI. OF METROPOLITAN SEATTLE
Street Address: 821 SECOND AVENUE
City: SEATTLE State: WASHINGTON Zip: 98104
Contact: STEVE GRISSOM, SERVICE DEVELOPMENT Telephone: 206-447-6398
Description: DUAL POWERED BUS
DIESEL AND ELECTRIC POWERED ARTICULATED BUS; DIESEL ENGINE IS TOO SMALL;
3 OR 4 SETS OF MODIFICATIONS NECESSARY BEFORE PRODUCTION MODELS MAY BE
PURCHASED
Manufacturer Information
Company: RENAULT U.S.A. INC., R.V.I. BUS DIVISION
Address: 499 PARK AVENUE; NEW YORK, NEW YORK 10022
Contact: Telephone: 212-980-8500

Manufacturer: RENAULT
No. of Vehicles: 2 Delivery Date: JUNE, 1981
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: NEW YORK STATE D.O.T.
Street Address: 2 WORLD TRADE CENTER, ROOM 5454
City: NEW YORK State: NEW YORK Zip: 10047
Contact: HARRY STANTON Telephone: 212-938-3299
Description: RENAULT MODEL PR100
38 FOOT BODY; IN-LINE ENGINE; NEED FOR IMPROVED MAINTENANCE ACCESSIBILITY
AND RELIABILITY; BUSES TESTED IN ALBANY, BUFFALO, NEW YORK, ROCHESTER,
SYRACUSE, AND WESTCHESTER
Manufacturer Information
Company: RENAULT U.S.A. INC., R.V.I. BUS DIVISION
Address: 499 PARK AVENUE; NEW YORK, NEW YORK 10022
Contact: Telephone: 212-980-8500

Manufacturer: SCANIA
No. of Vehicles: 3 Delivery Date: OCTOBER, 1981
Cost Per Vehicle: Purchase or Demonstration: DEMONSTRATION
Transit Property: NORWALK TRANSIT DISTRICT
Street Address: RR STATION P.O. BOX 32
City: NORWALK State: CONNECTICUT Zip: 06854
Contact: DICK GUNDERSON, TRANSP. SYSTEMS CENTER Telephone: 617-494-2654
Description: SCANIA MODEL BR112
VAN HOOL BODY ON A SCANIA CHASIS; BODY ON CHASIS CONSTRUCTION; 6 CYLINDER
DIESEL WITH VOITH TRANSMISSION; 40 FOOT BODY; 2 YEAR DEMONSTRATION TO END
IN FALL OF 1983
Manufacturer Information
Company: SAAB-SCANIA OF AMERICA, INC., SCANIA DIVISION
Address: SAAB DRIVE; P.O. BOX 697; ORANGE, CONNECTICUT 06477
Contact: RALPH T. MILLET, DIRECTOR Telephone: 203-795-5671

Manufacturer: SKILLCRAFT
No. of Vehicles: 23 Delivery Date: OCTOBER, 1981
Cost Per Vehicle: 98,625 Purchase or Demonstration: PURCHASE
Transit Property: SARASOTA COUNTY AREA TRANSIT
Street Address: 5303 PICKNEY AVENUE
City: SARASOTA State: FLORIDA Zip: 33583
Contact: JIM NEWCOMB, OPERATIONS MANAGER Telephone: 813-922-0702
Description: TRANSMaster MODEL
SEATING FOR 31; 8.2L V-8 DIESEL REAR MOUNTED ENGINE; LOW FLOOR; WIDE DOOR;
2 PROTOTYPES TESTED IN SUMMER OF 1981

Manufacturer Information
Company: SKILLCRAFT INDUSTRIES, INC.
Address: 355 CENTER COURT; VENICE, FLORIDA 33595
Contact: T.C. HUSTON, DOMESTIC/EXPORT SALES Telephone: 813-488-1501

APPENDIX B

SUMMARY OF INNOVATIVE FEATURES LISTED BY CITY

<u>FEATURE</u>	<u>LOCATION</u>	<u>NUMBER</u>	<u>MANUFACTURER</u>
AIR-COOLED ENGINE	PITTSBURGH, PENNSYLVANIA	1	IVECO
ARTICULATED	LOUISVILLE, KENTUCKY	15	CROWN-IKARUS
ARTICULATED	SAN JOSE, CALIFORNIA	15	M.A.N.
ARTICULATED	INDIANAPOLIS, INDIANA	21	M.A.N.
ARTICULATED	MILWAUKEE, WISCONSIN	40	CROWN-IKARUS
ARTICULATED	MEMPHIS, TENNESSEE	10	M.A.N.
ARTICULATED	ST. PAUL, MINNESOTA	62	M.A.N.
ARTICULATED	PITTSBURGH, PENNSYLVANIA	30	M.A.N.
ARTICULATED	ATLANTA, GEORGIA	10	M.A.N.
ARTICULATED	ALBANY, NEW YORK	8	CROWN-IKARUS
ARTICULATED	ATLANTA, GEORGIA	46	NEOPLAN
ARTICULATED	DALLAS, TEXAS	1	NEOPLAN

ARTICULATED	PORTLAND, OREGON	87	CROWN-IKARUS
ARTICULATED SMALL BUS	WICHITA, KANSAS	1	CHANCE
CLIMATE-SPECIFIC EQUIPMENT	BARROW, ALASKA	1	ONTARIO BUS INDUSTRIES
DOUBLE-DECK BUSES	LOS ANGELES, CALIFORNIA	20	NEOPLAN
DUAL POWERED BUS	SEATTLE, WASHINGTON	1	RENAULT
GAS TURBINE ENGINE	BALTIMORE, MARYLAND	5	GMC
HINO MODEL RC	NEW YORK, NEW YORK	2	HINO
HINO MODEL RUC 18S	NEW YORK, NEW YORK	1	HINO
HYDROGEN/PROPANE FUELED	SACRAMENTO, CALIFORNIA	1	BILLINGS ENERGY CORPORATION
MINI-BUSES	CLEVELAND, OHIO	15	ATLANTIC RESEARCH CORPORATION
ORION MODEL	INDIANAPOLIS, INDIANA	50	ONTARIO BUS INDUSTRIES
RENAULT MODEL PR100	NEW YORK, NEW YORK	2	RENAULT
SCANIA MODEL BR112	NORWALK, CONNECTICUT	3	SCANIA
SHORT WHEEL BASE	ST. PAUL, MINNESOTA	4	CARPENTER

SHUTTLE BUSES	DENVER, COLORADO	13	MINICAR-VETTER OF GERMANY
SHUTTLE BUSES	DENVER, COLORADO	6	MINICAR-VETTER OF GERMANY
SIX CYLINDER DIESEL	WALNUT CREEK, CALIFORNIA	30	GILLIG
TRANSMASTER MODEL	SARASOTA, FLORIDA	23	SKILLCRAFT
TURBO-CHARGED	LINCOLN, NEBRASKA	10	GRUMMAN
TURBO-CHARGED	LITTLE ROCK, ARKANSAS	20	BLUE BIRD

APPENDIX C

SUMMARY OF LOCATIONS AND MANUFACTURERS

<u>LOCATION</u>	<u>MANUFACTURER</u>
ALBANY, NEW YORK	CROWN-IKARUS
ATLANTA, GEORGIA	M.A.N.
ATLANTA, GEORGIA	NEOPLAN
BALTIMORE, MARYLAND	GMC
BARROW, ALASKA	ONTARIO BUS INDUSTRIES
CLEVELAND, OHIO	ATLANTIC RESEARCH CORPORATION
DALLAS, TEXAS	NEOPLAN
DENVER, COLORADO	MINICAR-VETTER OF GERMANY
INDIANAPOLIS, INDIANA	M.A.N.
INDIANAPOLIS, INDIANA	ONTARIO BUS INDUSTRIES
LINCOLN, NEBRASKA	GRUMMAN
LITTLE ROCK, ARKANSAS	BLUE BIRD
LOS ANGELES, CALIFORNIA	NEOPLAN
LOUISVILLE, KENTUCKY	CROWN-IKARUS

MEMPHIS, TENNESSEE	M.A.N.
MILWAUKEE, WISCONSIN	CROWN-IKARUS
NEW YORK, NEW YORK	HINO
NEW YORK, NEW YORK	RENAULT
NORWALK, CONNECTICUT	SCANIA
PITTSBURGH, PENNSYLVANIA	M.A.N.
PITTSBURGH, PENNSYLVANIA	IVECO
PORTLAND, OREGON	CROWN-IKARUS
SACRAMENTO, CALIFORNIA	BILLINGS ENERGY CORPORATION
SAN JOSE, CALIFORNIA	M.A.N.
SARASOTA, FLORIDA	SKILLCRAFT
SEATTLE, WASHINGTON	RENAULT
ST. PAUL, MINNESOTA	CARPENTER

ST. PAUL, MINNESOTA

M.A.N.

WALNUT CREEK, CALIFORNIA

GILLIG

WICHITA, KANSAS

CHANCE

APPENDIX D

MANUFACTURER INFORMATION

ATLANTIC RESEARCH CORPORATION

5390 CHEROKEE AVENUE; ALEXANDRIA, VIRGINIA 22314
703-642-4000

BILLINGS ENERGY CORPORATION

NOT AVAILABLE
NOT AVAILABLE

BLUE BIRD BODY COMPANY, CITY BUS SALES

P.O. BOX 937; FORT VALLEY, GEORGIA 31030
912-825-2021

CARPENTER BODY WORKS, INC.

MICHELL, INDIANA 47446
812-849-3131

CHANCE MANUFACTURING COMPANY, INC., COACH DIVISION

4219 IRVING STREET; WICHITA, KANSAS 67277-2328
316-942-7411

CROWN COACH CORPORATION, TRANSIT VEHICLE DIVISION

2428 EAST 12TH STREET; LOS ANGELES, CALIFORNIA 90021
213-627-4021

GENERAL MOTORS CORPORATION, TRUCK AND COACH DIVISION

660 SOUTH BOULEVARD EAST; PONTIAC, MICHIGAN 48053
313-857-4077

GILLIG CORPORATION

25800 CLAWITER ROAD; HAYWARD, CALIFORNIA 94545
415-785-1500

GRUMMAN FLXIBLE CORPORATION

970 PITTSBURGH DRIVE; DELAWARE, OHIO 43015
614-369-7671

HINO MOTORS, LIMITED; PLANNING DIVISION

7-17, NIHONBASHI 1-CHOME; CHOU-KU, TOKYO 103; JAPAN
03-281-3323

IVECO, BUS DIVISION

VIA TOSCANA 9; PESCARITO, SAN MAURO TORINESE; TORINO 10100; ITALY
011-244644

M.A.N. TRUCK AND BUS CORPORATION

201 SOUTH COLLEGE STREET; CHARLOTTE, NORTH CAROLINA 28202
704-376-6000

MCR TECHNOLOGY, INC.

55 DEPOT ROAD; GOLETA, CALIFORNIA 93117
805-964-0671

NEOPLAN U.S.A. CORPORATION, SALES DIVISION
627 SOUTH BROADWAY, SUITE B; BOULDER, COLORADO 80303
303-499-4040

ONTARIO BUS INDUSTRIES, INC.
5395 MAINGATE DRIVE; MISSISSAUGA, ONTARIO L4W 2G6; CANADA
416-625-9510

RENAULT U.S.A. INC., R.V.I. BUS DIVISION
499 PARK AVENUE; NEW YORK, NEW YORK 10022
212-980-8500

SAAB-SCANIA OF AMERICA, INC., SCANIA DIVISION
SAAB DRIVE; P.O. BOX 697; ORANGE, CONNECTICUT 06477
203-795-5671

SKILLCRAFT INDUSTRIES, INC.
355 CENTER COURT; VENICE, FLORIDA 33595
813-488-1501

APPENDIX E

REPORT OF NEW TECHNOLOGY

This report assembles for the first time a list of innovative transit vehicle technology that has been put in place between 1979 and 1982 by U.S. transit operators. The transit operator, vehicle manufacturer and innovative characteristics are listed.

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Glasser, Howell S.

Listing of new bus
technology applic

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